Forest Site Management Section

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July 8, 1997

SILVICULTURE NOTE 13

PROGRESS REPORT

SX TRIAL 91-105-Q

FERTILIZATION AT THE TIME OF PLANTING
UBC RESEARCH FOREST, THREE-YEAR RESULTS

Introduction

Fertilization at the time of planting (FAP) has, in many parts of the province, become a routinely prescribed regeneration practice. It is prescribed to deal with a wide variety of perceived limitations to seedling establishment, including general planting check. This trial examines the effect of two different rates of a FAP fertilizer on the outplanting performance of Fdc and Cw seedlings planted on different mechanically prepared microsites.

Sites

The UBC Research Forest test site is located northeast of Maple Ridge in the Chilliwack Forest District (Figure 1). The trial is in the moist maritime Coastal Western Hemlock (CWH) subzone of the biogeoclimatic zone (Table 1). The site was severely bladed in 1978 as part of a stand conversion operation. The mounds were made in the fall of 1990 with the B.C. Ministry of Forests mounder. These mounds have an inverted humus layer capped with mineral soil. The combination of mounding and FAP was prescribed to minimize the effects of severe brush competition expected on this site.

FIGURE 1. Location of UBC Research Forest FAP trial.

FS 713 HFP 97/6

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106-06497/

TABLE 1. Site conditions for UBC Research Forest FAP/mounding trial

Site conditions and history	
Biogeoclimatic zone	CWHmm1
Site series	(05) BaCw–Foamflower
Moisture/Nutrient regime	4–5/D
Logged	1950, 1963
Site preperation	1978, Stumped, brush blade and ripped 1990, Mounded
Planted	1991

Species and Stock Type

Two species are used in the trial (Table 2). The Fdc seedlings averaged 21 cm at planting while the Cw were only 15 cm tall.

TABLE 2. Species, stock type combinations used at UBC Research Forest Mounding/ FAP trial

Species	Seedlot	Stock type
Cw	20202	PSB 313B 1+0
Fdc	4542	PSB 313B 1+0

Treatments

There was only one FAP treatment used at the UBC Research Forest test site (Table 3). Both species were spring-planted.

TABLE 3. FAP treatment used in species/mounding/ FAP trial at UBC Research Forest

Treatment	Formulation	Duration (month)	Fertilizer rate (g/tree)	N rate (g N/tree)
Control				
GROMAX #2™	12-5-8	24	5.0	0.60

The rate of N applied is considerably less than that normally prescribed as a broadcast, surface application. GROMAX #2™ is an ammonia-rich N-source that releases its contents by rupturing rather than dissolving. The fertilizer is also blended with a hydrophilic gel to improve the soil moisture conditions around the seedling. The duration of the fertilizer release is rated as 24 months for a specific combination of soil moisture and temperature. The expected duration of release is determined under laboratory conditions for specific temperatures and moisture content. Given the cool soil temperatures and site conditions it is possible that the fertilizer may last longer on the site than under the standard release conditions quoted by the manufacturer.

In addition to being subjected to FAP treatments, seedlings were planted on two different microsites: mounded and unmounded. Seedlings that were planted on the mounds were planted into the inverted humus.

Results

FAP prevented planting check in both species. Regardless of planting microsite, the unfertilized seedlings only grew 5–10 cm in the first year. By contrast, the FAP treated seedlings grew more than 25 cm in the first year.

Survival

The survival of both species was excellent (Figure 2). There were no statistically significant differences in survival between the fertilized seedlings and the unfertilized controls, nor were there any differences between mounding treatments. Browsing was not observed to be a problem for either species at this site.

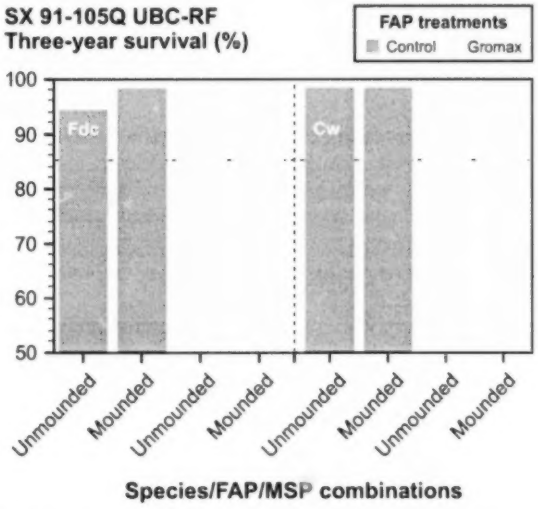

FIGURE 2. Third-year survival of species/planting microsite/FAP treatment combinations at UBC Research Forest. The horizontal line at 85% is a reference line of silviculturally acceptable survival.

Height Growth

There was a statistically significant increase of 20 to 35 cm for the FAP combinations over the unfertilized controls for both species regardless of the planting microsite (Figure 3). Mounding by itself was ineffective at improving the height growth of either species. For Fdc, the combination of fertilization and mounding resulted in a statistically significant difference in height over the unfertilized mound. However the combination of fertilization and mounding had no statistically significant effect for Cw. Unlike other trials, FAP appears to have reduced the planting check in the first year. For Fdc, the mounding/fertilization combination has continued to benefit the growth in the second year. The increased variability in height growth on the mounds is probably due to the inconsistency in the placement of the fertilizer.

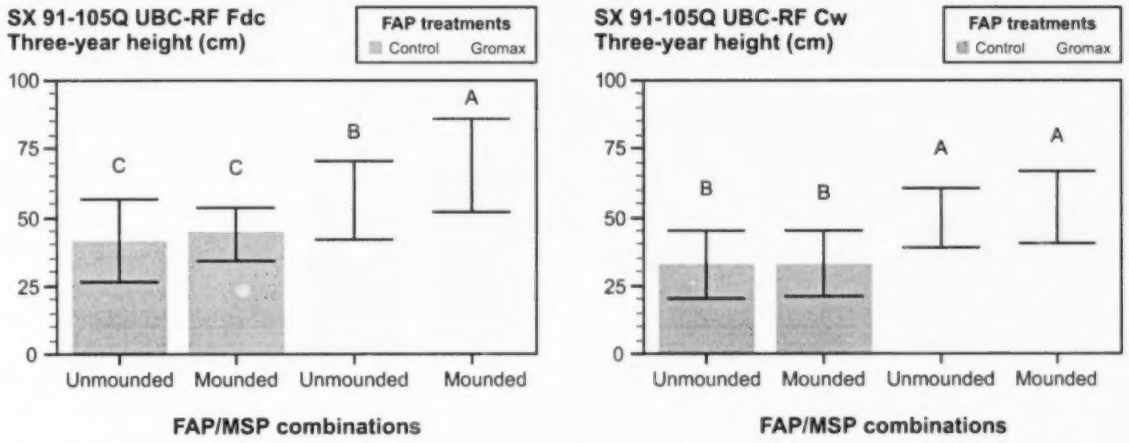

FIGURE 3. Third-year total height growth for different species/planting microsite/FAP treatment combinations at UBC Research Forest. Treatment means marked with the same letter are not considered statistically significantly different at a probability of 5%. The error bar about the mean three-year height is the standard error of the mean.

Conclusions and Recommendations

FAP offered a significant reduction of planting check, especially for Fdc when combined with mounding. This significant increase in height is possibility due to the aggressive clearing of the site which may have reduced the fertility. It is expected that this height difference will continue to persist for a number of years, but there will be no further effect of fertilization on annual increment. The effect of FAP on free growing requirements will be assessed after five growing seasons.